

## REMARKS

This Amendment is submitted in response to the Official Letter dated May 13, 2004. Claims 1, 5, 6, 8 through 10 and 13 have been amended. Claims 11 and 12 have been cancelled. The application now includes claims 1 through 10 and 13 through 19, with claims 1, 9 and 13 being independent claims. Favorable reconsideration of the application, as amended, is respectfully requested.

In the Official Letter, the Examiner rejected claims 1 through 3, 5, 6, 8, 11, 12, 14 and 16 through 18 under U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,528,497 to Yamamoto et al. With regard to claim 1, the Examiner stated that the Yamamoto et al. reference taught all of the limitations recited in the claim.

Applicants have amended independent claim 1 to recite a steering controller adapted to be connected to the vehicle steering system, said controller operative during a steering maneuver to encourage the driver to steer the vehicle back to a non-oversteering condition through the application of a compensating torque. The Yamamoto et al. reference states from column 6, lines 26 through 35, that:

Thus, when the vehicle 25 deviates from the intended straight path 26 due to crosswind as illustrated in Fig. 10, the lateral acceleration G and the yaw rate  $\gamma$  of the vehicle are detected, and the electric motor 10 is activated in such a manner that the lateral acceleration G and the yaw rate  $\gamma$  of the vehicle 25 may be cancelled even in the absence of any intentional efforts to turn the steering wheel 3 by the vehicle operator, or that the deviation of the vehicle 25 from the straight path 26 may be eliminated and the vehicle 25 may be brought back on the straight path 26.

Applicants believe that the Yamamoto et al. reference teaches a steering system designed to maintain a vehicle traveling in a straight line when the vehicle is subject to an external interference, such as a crosswind. However, amended independent claim 1 recites a steering controller that is operative during a steering maneuver to encourage the driver to steer the vehicle back to a non-oversteering condition through the application of the compensating torque. Accordingly, applicants do not believe that

amended independent claim 1 is anticipated by the Yamamoto et al. reference and respectfully request that the Examiner withdraw his rejection of the claim.

Claims 2 and 3 are dependent upon amended independent claim 1 and include the limitations recited therein. Accordingly, for the reasons given above, applicants also do not believe that claims 2 and 3 are anticipated by the Yamamoto et al. reference and respectfully request that the Examiner withdraw his rejection of the claims.

Regarding claim 4, the Office Action Summary Sheet indicated that the claim was rejected; however, the examiner did not provide a specific basis for the rejection. The undersigned attorney contacted the Examiner by telephone on May 25, 2004, and indicated that the applicants could not respond to the rejection without knowing the basis for the rejection. The Examiner stated that the undersigned attorney should refer to the omission in this response and that the Examiner would then provide a basis for the rejection in the next Office Action. The Examiner also stated that, because the error of omission was the fault of the Patent Office, the next Office Action would not be a Final Office Action.

Regarding claim 5, the Examiner stated that the Yamanoto et al. reference teaches that vehicle state information includes lateral acceleration, sensed by item 17. Applicants have amended claim 5 to recite a steering controller that receives a pair of acceleration measurements from a first lateral acceleration sensor placed in the front axle of the vehicle and a second lateral acceleration sensor placed in the rear axle of the vehicle. The Yamanoto et al. reference states, in column 4, lines 54 through 56, that:

The vehicle body carries a lateral acceleration sensor 17 for producing a signal corresponding to the lateral acceleration applied to the vehicle body, ...

Thus, applicants believe that the Yamanoto et al. reference actually discloses a single lateral acceleration sensor that produces a single lateral acceleration signal. Thus, nothing in the Yamanoto et al. reference shows or suggests two lateral

acceleration sensors producing a pair of lateral acceleration signals as recited in amended claim 5. Additionally, nothing in the the Yamanoto et al. reference discloses mounting the acceleration sensors on the vehicle axles, as recited in amended claim 5. Accordingly, applicants believe that amended claim 5 is patentable over the art of record and respectfully request that the Examiner withdraw his rejection of the claim.

Regarding claim 6, the Examiner stated that the Yamanoto et al. reference teaches lateral acceleration being measured by a phase detection device; however, the Examiner also states that such a phase detection device is not explicitly shown. Applicants have reviewed the Yamanoto et al. reference and have not found any mention of a phase detection device. Nevertheless, applicants have amended claim 6 to recite a steering controller that includes a phase detection device. Amended claim 6 further recites that signals corresponding to the lateral accelerations measured at the front and rear axles are passed through the phase detection device. Amended claim 6 also recites that the phase detection device is operable to determine a phase difference between the measurements from the first and second lateral acceleration sensors with the phase difference being used for calculation of the magnitude of oversteer. As described above, applicants believe that the Yamanoto et al. reference teaches a single lateral acceleration sensor that produces a single lateral acceleration signal. Thus, the device disclosed in the Yamanoto et al. reference can not teach determining a phase difference between two lateral acceleration signals, as recited in amended claim 6, since only one lateral acceleration signal exists in the Yamanoto et al. reference. Accordingly applicants believe that amended claim 6 is patentable over the art of record and respectfully request that the Examiner withdraw his rejection of the claim .

Regarding claim 8, the Examiner stated that the Yamanoto et al. reference teaches a determination of oversteering that is based upon representation models of the vehicle, as described in column 8, lines 1 through 63 of the reference. Applicants have amended claim 8 to recite a steering controller that is operative to derive an estimation of the tendency of the vehicle to oversteer based upon a first vehicle model representing an understeering vehicle and a second vehicle model representing an

oversteering vehicle which are compared to provide an indication of vehicle oversteer magnitude.

The Yamanoto et al. reference states, in column 8, lines 5 through 11, that:

Then, the vehicle speed  $V$  is read (step 23'), and a reference yaw rate response model  $\gamma_0$  is computed according to the previously determined transfer function of the vehicle (step 24'). Then, the current yaw rate  $\gamma$  is read (step 25'), and the difference or the deviation  $\gamma - \gamma_0$  between the current yaw rate  $\gamma$  and the reference yaw rate response model  $\gamma_0$  [is computed] (step 26').

Based upon the above, applicants believe that the Yamamoto et al. reference teaches use of a single yaw rate response model. Nothing in the Yamamoto et al. reference shows or suggests using a first vehicle model representing an understeering vehicle and a second vehicle model representing an oversteering vehicle as recited in amended claim 8. Accordingly, applicants believe that amended claim 8 is patentable over the art of record and respectfully request that the Examiner withdraw his rejection of the claim.

Regarding claim 14, the claim recites a steering controller that is operative to control steering by means of a closed loop control of the steering wheel velocity upon detection of an oversteer condition. Applicants' attorney has carefully reviewed the Yamamoto et al. reference and has not found any disclosure of a closed loop control of the steering wheel velocity that is used to control the velocity of the steering wheel of a vehicle upon detection of an oversteer condition. Accordingly, absent such a disclosure in the reference, applicants do not believe that claim 14 is anticipated by the Yamamoto et al. reference and respectfully request that the Examiner withdraw his rejection of the claim.

Regarding claim 16, the Examiner stated the Yamamoto et al. reference teaches a controller that includes logic comprising a threshold (limit) for the activation and deactivation of the steering control. The Examiner then refers to column 5, lines 31 through 39 of the reference, where it is stated that:

In the active steering reaction computing unit 23 in the control unit 20, the process shown by the flow chart of Fig. 3 is cyclically executed at a prescribed period. First of all, in step 1, the output signals from the various sensors are read out, and the steering angular speed and the yaw acceleration are computed. In step 2, the steering reaction TA is determined. A limit is set on the target steering reaction in step 3, and this control signal is added to the output of the electric power steering control unit 22 in step 4.

Claim 16 recites a steering controller that includes an activation controller which is operative to fade the steering controller in when the activation controller has determined that the oversteer has exceeded limits. Applicants believe that the Yamamoto et al. reference discloses a steering correction signal that is limited to a maximum valve. As described above, in the Yamamoto et al. reference, the steering correction signal is continuously added to the power steering control unit, but limited to a maximum magnitude. The activation controller recited in claim 16 does not allow application of steering correction until an oversteer threshold has been exceeded, at which time the steering correction is faded in. Nothing in the Yamamoto et al. reference shows or suggests a oversteer threshold for triggering a fade in of a steering controller, as recited in claim 16. Indeed, because the steering correction signal is continuously applied in the Yamamoto et al. reference, applicants believe that the reference actually teaches away from the method of operation recited in claim 16. Accordingly, applicants believe that claim 16 is patentable over the art of record and respectfully request that the Examiner withdraw his rejection of the claim.

Claims 17 and 18 are dependent upon claim 16 and include the limitations recited in the claim. Accordingly, for the reasons given above, applicants also believe that claims 17 and 18 are patentable over the art of record and respectfully request that the Examiner withdraw his rejection of the claims.

The Examiner also rejected claim 10 under U.S.C. §103(a) as being unpatentable over the Yamamoto et al. reference in view of U.S. Patent No. 6,349,789 to Nakano et al. The Examiner stated that the Yamamoto et al. reference teaches all of the limitations recited in claim 10 except for the inclusion of brake intervention. The Examiner further stated that the Nakano et al. reference teaches the general concept of

including a braking system in a steering system. The Examiner then concluded that it would have been obvious to modify the teaching of the Yamamoto et al. reference to include the braking system of the Nakano et al. reference to enhance the stabilization of the vehicle.

Applicants have amended claim 10 to recite a steering controller that is operative to derive an estimation of the tendency of the vehicle to oversteer based upon a percentage of the VSC threshold at which brake intervention in oversteer occurs such that the steering assistance controller is actuated before the VSC. Thus, as explained at the bottom of page 15 in the specification, by arranging for the steering control to actuate ahead of the VSC system, as recited in amended claim 10, there will be less VSC action and the accompanying slowing of the vehicle is eliminated. The Nakano et al. reference, as stated in the Abstract, discloses a system that utilizes a steering device that cancels out changes in steering torque generated during activation of a VSC system. Thus, the Nakano et al. reference teaches a steering device that is activated after the VSC is activated. Nothing in the Nakano et al. reference shows or suggests activation of a steering control before the VSC is activated, as recited in amended claim 10. Indeed, by activating the steering device after the VSC, the Nakano et al. reference actually teaches away from the operation recited in amended claim 10. Accordingly, applicants believe that amended claim 10 is patentable over the art of record and respectfully request that the Examiner withdraw his rejection of the claim.

The Examiner further objected to claims 7, 9, 13, 15 and 19 as being dependent upon a rejected base claim. The Examiner stated that the claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant has rewritten claim 13 in independent form to include all of the limitations of original base claim 1 and intervening claims 11 and 12. Accordingly, rewritten claim 13 is in condition for allowance and applicants respectfully request that the Examiner withdraw his objection to the claim. Similarly, applicants have rewritten claim 9 in independent form to all of the limitations of original base claim 1 and intervening claim 8. Accordingly, rewritten claim 9 is in

condition for allowance and applicants respectfully request that the Examiner withdraw his objection to the claim.

Regarding claims 7, 15 and 19, the claims are dependent upon amended independent claim 1 and include the limitations contained therein. Accordingly, for the reasons given above, applicants believe that claims 7, 15 and 19 are no longer dependent upon a rejected base claim and respectfully request that the Examiner withdraw his objection to the claims.

In view of the amendments and above remarks, it is believed that the application is in condition for allowance.